**Fe-OM interactions may act as a mechanism for DOC mobilization following seawater inundation in coastal upland forest soils.**

Coastal environments are experiencing increased storm surge and saltwater flooding due to climate change. This may influence soil carbon stability and turnover mechanisms, including changes in ionic strength and iron speciation which may release soil OM associated with minerals following seawater inundation. TEMPEST is a large ecosystem scale experiment located in Chesapeake Bay. It is designed to mimic the impact that potential flooding disturbances would have on upland coastal forest. They initially observed a change in carbon stability after flooding the TEMPEST experimental forest with saltwater. To mimic these processes in the laboratory, soil collected from an upland forest in Chesapeake Bay was washed with saltwater, while oxygen exposure was altered to mimic shifts in oxygen availability that may occur during flooding. Subsequent washes with DI water were performed to simulate precipitation, and each wash was centrifuged to examine DOC present in colloidal fractions (0.45-1.0 mm, 0.1-0.45 mm, and <0.1 mm) to understand which size fractions the bulk of DOC is mobilized in. Carbon was quantified and characterized using TOC and CDOM and the mineral components were analyzed using the ferrozine assay and ICP-MS. We found that DOC mobilization peaked several washes after the initial saltwater wash, and that the 0.1-0.45 mm fraction contained the bulk of the mobilized DOC. The observed correlation between Fe(III) and DOC, specifically aromatic DOM, suggests that there may be disassociation of aromatic ligands following transformation of Fe(II) to Fe(III) that may be important for DOC mobilization. Results from these experiments suggest that the inundation of coastal upland forest may trigger mechanisms (Fe-OM and ionic strength) that impact soil carbon stability in coastal forest soils. Which may be important for understanding how sea level rise driven by climate change will impact carbon cycling along threatened the coasts as well as adjusting current carbon cycling models.